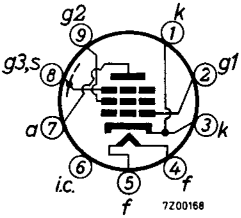
S.Q. TUBE

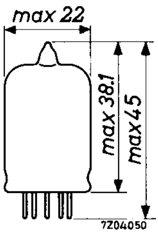
Special quality pentode designed for use as broad band amplifier.

QUICK REFERENCE DATA			
Life test	10 000 hours		
Mechanical quality	Shock and vibration resistant		
Low microphony level			
Base	Noval		
Heating	Indirect a.c. or d.c.; parallel supply		
Heater voltage	V_f	6.3	V
Heater current	I_f	320	mA
Anode current	I_a	13	mA
Mutual conductance	S	16.5	mA/V
Equivalent noise resistance	R_{eq}	330	Ω
Hum voltage	V_{g_1}	<100	μV

DIMENSIONS AND CONNECTIONS Dimensions in mm

Base: Noval





CHARACTERISTICS

Column I Nominal value or setting of the tube
II Range values for equipment design: Initial spread
III Range values for equipment design: End of life

		I	II	III	
Heater voltage	V_f	6.3			V
Heater current	I_f	320	300 - 340		mA
Anode supply voltage	V_{ba}	190			V
Grid No.3 voltage	V_{g_3}	0			V
Grid No.2 supply voltage	V_{bg_2}	160			V
Grid No.1 supply voltage	$+V_{bg_1}$	9			V
Cathode resistor	R_k	630			Ω
Anode current	I_a	13	12.2-13.8	min.11.5	mA
Grid No.2 current	I_{g2}	3.3	2.9- 3.7		mA
Mutual conductance	S	16.5	14.2-18.6	min. 11	mA/V
Amplification factor grid No.2 to grid No.1	$\mu_{g_2g_1}$	53			
Internal resistance	R_i	100			kΩ
Equivalent noise resistance frequency 45 MHz	R_{eq}	330			Ω
Negative grid No.1 current	$-I_{g_1}$		max. 0.2	max.0.5	μA
Anode supply voltage	V_{b_a}	180			V
Grid No.3 voltage	V_{g_3}	0			V
Grid No.2 supply voltage	V_{bg_2}	150			V
Cathode resistor	R_k	100			Ω
Anode current	I_a	11.5			mA
Grid No.2 current	I_{g_2}	2.9			mA
Mutual conductance	S	15.5			mA/V

CHARACTERISTICS (continued)

		I	II	III	
Cut-off voltage	$-V_{g_1}$	4.5			V
Anode voltage	V_a	180			V
Grid No.3 voltage	V_{g_3}	0			V
Grid No.2 voltage	V_{g_2}	150			V
Anode current	I_a		max.0.8		mA
Leakage current between cathode and heater Voltage between cathode and heater V_{kf} = 100 V	I_{kf}		max. 10	max.20	μA
Insulation resistance between two electrodes Voltage between electrodes = 100 V	R_{ins}		min. 100	min. 50	MΩ
Hum voltage Grid No.1 resistor R_{g_1} = 0.5 MΩ Centre tapping of heater transformer grounded Cathode resistor by-passed	V_{g_1}		max.100		μV
Vibrational noise output					
With vibration frequency = 50-2000 Hz	V_{g_1}		max.500		mV_{RMS}
With vibration frequency = 50 Hz	V_{g_1}		max.200		mV_{RMS}

Anode supply voltage V_{b_a} = 216 V

Anode resistor R_a = 2 kΩ

Grid No.2 supply voltage V_{bg_2} = 160 V

Grid No.3 voltage V_{g_3} = 0 V

Cathode resistor R_k = 630 Ω (not by-passed)

Grid No.1 supply voltage $+V_{bg_1}$ = 9 V

Acceleration (peak value) = 10 g

CAPACITANCES . With external shield

		I	II	
Anode to grid No.3, grid No.2 cathode, heater and screen	C_{a/g_3g_2kfs}	3.45		pF
Grid No.1 to grid No.3, grid No.2 cathode, heater and screen	C_{g_1/g_3g_2kfs}	7.6		pF
Anode to grid No.1	C_{ag_1}		max.0.03	pF

SHOCK AND VIBRATION RESISTANCE

The following test conditions are applied to assess the mechanical quality of the tube. These conditions are not intended to be used as normal operating conditions.

Shock

The tube is subjected 5 times in each of 4 positions to an acceleration of 500 g supplied by an NRL shock machine with the hammer lifted over an angle of 30°.

Vibration

The tube is subjected during 32 hours in each of 3 positions to a vibration frequency of 50 Hz with an acceleration of 2.5 g.

LIFE

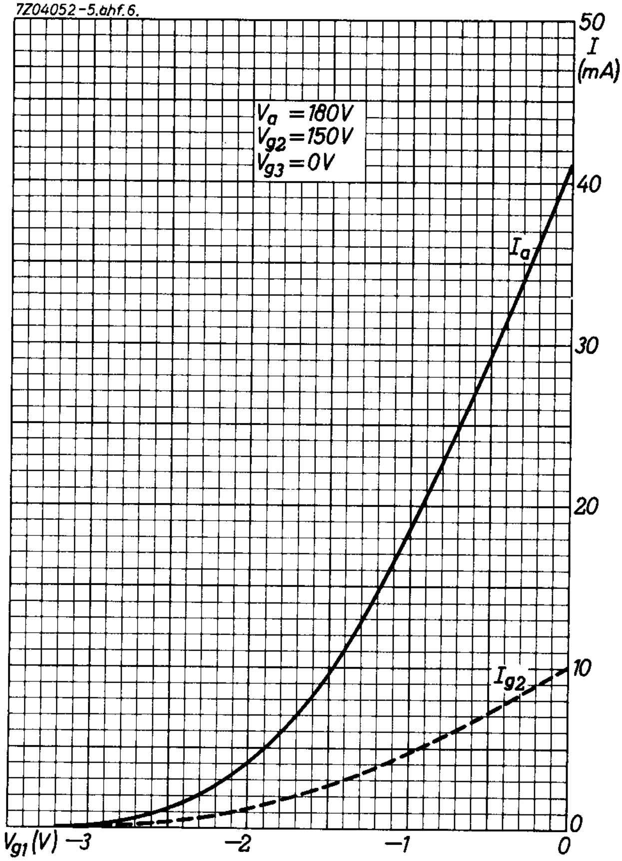
Production samples are tested to be within the end of life values (column III) under the following conditions during 10000 hours.

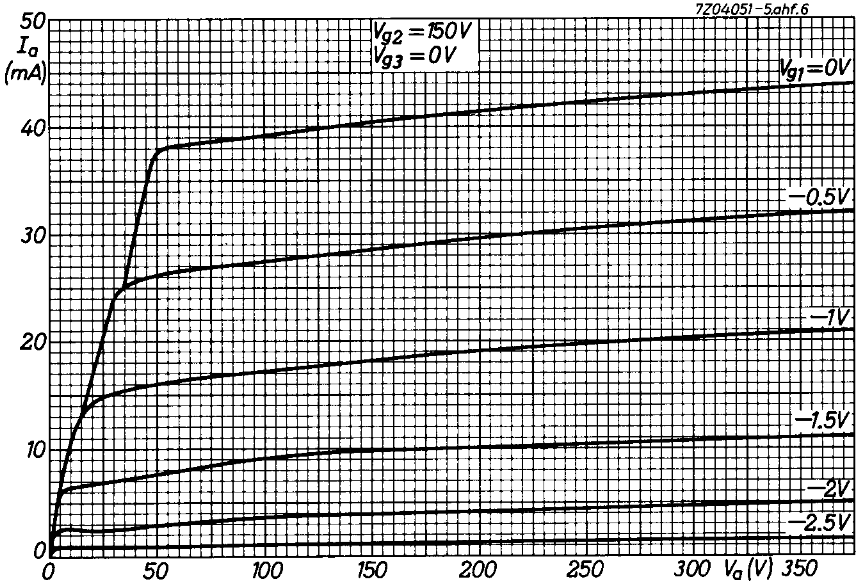
Anode supply voltage	V_{b_a}	190	V
Grid No.3 voltage	V_{g_3}	0	V
Grid No.2 voltage	V_{g_2}	160	V
Grid No.1 supply voltage	$+V_{bg_1}$	9	V
Cathode resistor	R_k	630	Ω
Voltage between cathode and heater (cathode negative)	V_{kf}	70	V

LIMITING VALUES (Absolute max. rating system)

Anode voltage	V_{a_o}	max.	400	V
	V_a	max.	210	V
Anode dissipation	W_a	max.	3	W
Grid No.2 dissipation	W_{g_2}	max.	0.7	W
Grid No.2 voltage	$V_{g_{2o}}$	max.	400	V
	V_{g_2}	max.	175	V
Grid No.1 voltage				
positive	$+V_{g_1}$	max.	0	V
negative	$-V_{g_1}$	max.	50	V
negative peak	$-V_{g_{1p}}$	max.	100	V
Grid No.1 resistor				
fixed bias	R_{g_1}	max.	0.25	MΩ
automatic bias	R_{g_1}	max.	0.5	MΩ
Cathode current	I_k	max.	25	mA
Voltage between cathode and heater	V_{kf}	max.	60	V
Bulb temperature	t_{bulb}	max.	165	°C

Heater voltage: The average heater voltage should be 6.3 V.
Variation of the heater voltage exceeding the range of 6.0 V to 6.6 V will shorten the tube life.
The tolerance of heater current (column II) should be taken into account.


7Z04052-5.ahf.6.
50
I
(mA)
V_a =180V
V_{g2}=150V
V_{g3}=0V
40
I_a
30
20
10
I_{g2}
0
V_{g1}(V) −3
−2
−1
0


7Z04051-5.ahf.6
$V_{g2}=150V$
$V_{g3}=0V$
$V_{g1}=0V$
−0.5V
−1V
−1.5V
−2V
−2.5V
50
I_a
(mA)
40
30
20
10
0
0
50
100
150
200
250
300
V_a(V)
350

PHILIPS

Data handbook

Electronic components and materials

E186F

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